adic

FastStor 2
User Guide

Document Number: 6-00515-03 Rev A

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Introduction

This manual provides sufficient training information for operation of your FastStor 2 Autoloader. It is recommend that you read through the manual before using your FastStor 2 Autoloader.

Audience

This guide is intended for general use by anyone interested in learning about or using the FastStor 2 autoloader.

The section topics in this guide include:

- *Introduction*—An overview of the FastStor 2 autoloader documentation set.
- *Description*—Provides general information about the FastStor 2 autoloader and its components.
- *Getting Started*—Describes the basic set-up procedures for your FastStor 2 autoloader.
- *Operating the Autoloader*—Describes normal operating procedures of the FastStor 2 autoloader.
- *Managing the Autoloader*—Describes how to manage the autoloader, including how to update firmware and how to change SCSI IDs.
- *Troubleshooting and Diagnostics*—Describes message processing and troubleshooting hints.
- *Specifications*—Provides specification information for the FastStor 2 autoloader.

The following documents are associated with this guide:

- *FastStor 2 Quick Start Guide* (6-00516-01 Rev. A)
- *ADIC Products System Information Guide* (6-00618-01 Rev. A). Describes the hazard symbols, messages, safety features, and operational considerations for the safe operation of this ADIC Product.

Safety Information

The following symbols and highlighted passages note important information:

Symbol	Description	Definition	Consequence
⚠ WARNING:	WARNING:	Imminent hazardous electrical situation	Death or serious injury
⚠ CAUTION:	CAUTION:	Potential damaging situation	Possible damage to the product, data, or environment
NOTE:	NOTE:	Indicates important information that helps make better use of the system	No hazardous or damaging consequences

Formatting Conventions

The following is a list of formatting conventions used throughout this document:

Italics	• Headline, e. g., Chapter 2, Description • File name, e. g., ERRORS.TXT
Bold	• Special Term, e. g., **Utilities** • Operating element/key on the Operator Panel • Terms appearing on the Operator Panel
Courier	• State of the equipment,e.g., ONLINE • Switch position, e. g., ON, OFF

An operator is responsible for ensuring that only qualified personnel perform the following procedures on the equipment:

- Prepare for operation
- Set-up
- Start-up
- Operate
- Shutdown
- Maintenance
- Restart

CAUTION: **CAUTION: Operation on the FastStor 2 by untrained personnel can lead to equipment malfunction and void the warranty.**

WARNING: SOME WORK AND MODIFICATIONS CAN ONLY BE PERFORMED WITH THE APPROPRIATE QUALIFICATIONS AND TRAINING (FOR EXAMPLE, REPLACEMENT OF THE POWER SUPPLY). MOST IMPORTANTLY, KNOW AND OBSERVE ALL SAFETY RULES BEFORE WORKING WITH THE EQUIPMENT.

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Safety

Read all safety and operating instructions before operating this product. Keep this manual for future reference. This unit is engineered and manufactured to assure your personal safety. Improper use can result in potential electrical shock or fire hazards.

NOTE: In addition to the safety instructions in this guide, local and professional safety rules apply.

Intended Use

This equipment is designed for processing magnetic tape cartridges. Any other application is not considered the intended use. ADIC shall not be held liable for damage arising from unauthorized use of the library. The user assumes all risk in this aspect.

Safeguards

To maintain the safeguards, observe the following basic rules for installation, use, and servicing of the FastStor 2:

- **Heed Warnings**—Adhere to all warnings on the product and in the operating instructions.

- **Follow Instructions**—Follow all installation and operating instructions.

- **Ventilation**—Situate the FastStor 2 so that its location or position provides adequate front and rear ventilation (at least two inches).

- **Heat**—Situate the product away from heat sources such as radiators, heat registers, furnaces, or other heat-producing appliances.

- **Power Sources**—Connect the FastStor 2 to a power source only of the type directed in the operating instructions or as marked on the product label.

- **Power Cord Protection**—Route the AC line cord so that it is not likely to be walked on or pinched by items placed upon or against it, paying particular attention to the cord at the wall receptacle and the point where the cord exits from the product.

- **Object and Liquid Entry**—Take care to ensure that objects do not fall and liquids are not spilled into the product's enclosure through openings.

- **Servicing**—Do not attempt to service the product beyond that described in the operating and installation instructions. All other servicing should be referred to qualified service personnel.

Precautions

- Do not use oil, solvents, gasoline, paint thinners, or insecticides on the unit or near the unit. Vapors from these types of chemicals can damage the tape media components.

- Do not expose the unit to moisture or store unit in temperatures higher than 60 ºC (140 ºF), or to extreme low temperatures. See **Environment** specifications for operating temperatures.

- Keep the unit away from direct strong magnetic fields, excessive dust, and electronic/electrical equipment that generate electrical noise.

- Hold the AC power plug by the head when removing it from the AC source outlet; pulling the cord can damage the internal wires.

- Use the unit on a firm, level surface free from vibration.

Protective Devices

The FastStor 2 is equipped with the following protective devices:

- Front Power Switch

Front Power Switch

Switching off the Front Power Switch removes power from the electronics which causes the picker to stop immediately. This switch also removes power from the drives.

⚠ **WARNING:** THE FRONT POWER SWITCH FUNCTIONS AS A POWER INTERRUPT ONLY. TO COMPLETELY REMOVE ALL POWER, DISCONNECT THE AC LINE CORD FROM THE ELECTRICAL SOURCE.

Regulatory Notices

ADIC libraries are designed, tested, and classified for their intended electromagnetic environment. These electromagnetic environment classifications generally refer to the following harmonized definitions:

 Class A is typically for business or industrial environments.

 Class B is typically for residential environments.

To determine which classification (Class A or B) applies to your tape library, examine all registration labels located on the bottom, the back panel, or on the inside of the chassis below the magazines.

Federal Communication Commission Notice (USA only)

To determine which classification applies to your library, examine all FCC registration labels located on the bottom or back panel of your library or on installable components. If any one of the labels carries a Class A rating, your entire system is considered to be a Class A digital device. If all labels carry either the Class B rating distinguished by either an FCC ID number or the FCC logo, your system is considered to be a Class B digital device.

Once you have determined your system's FCC classification, read the appropriate FCC notice here. Note that FCC regulations provide that changes or modifications not expressly approved by ADIC could void your authority to operate this equipment.

This device complies with Part 15 of the FCC rules. Operation is subject to the following two conditions:

- This device may not cause harmful interference.

- This device must accept any interference received, including interference that may cause undesired operation.

NOTE: Use only shielded cables for connecting peripherals to this device to reduce the possibility of interference with radio and television reception. Using shielded cables ensures that you maintain the appropriate FCC radio frequency emissions compliance (for a Class A device) or FCC Certification (for a Class A device) of this product.

Class A

This equipment has been tested and found to comply with the limits for a Class A digital device pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the manufacturer's instruction manual, may cause harmful interference with radio communications.

Operation of this equipment in a residential area is likely to cause harmful interference, in which case you will be required to correct the interference at your own expense.

Class B

This equipment has been tested and found to comply with the limits for a Class B digital device pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the manufacturer's instruction manual, may cause interference with radio communications. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, you are encouraged to try to correct the interference by one or more of the following measures:

- Reorient or relocate the receiving antenna.

- Increase the separation between the equipment and the receiver.

- Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.
- Consult the dealer or an experienced radio/television technician for help.
- Obtain a copy of the following booklet:
  - FCC Interference Handbook, 1996, available from the U.S. Government Printing Office, Washington, DC 20402, Stock No. 004-000-00450-7.

In compliance with FCC regulations, the following information is provided on the device or devices covered in this document.

FCC Declaration of Conformity	
Product Name:	FastStor 2
Model Number:	FS2
Company Name:	**A**dvanced **D**igital **I**nformation **C**orporation PO Box 97057 Redmond, WA 98073-9757 USA (425) 881-8004

IC Notice (Canada Only)

To determine which classification (Class A or B) applies to your tape library, examine all registration labels located on the bottom, the back panel, or on the inside of the chassis below the magazines. A statement in the form of "IC Class A ICES-3" or "IC Class B ICES-3" will be located on one of these labels.

Note that Industry Canada regulations provide that changes or modifications not expressly approved by the tape library manufacturer could void your authority to operate this equipment.

This Class A (or Class B, if so indicated on the registration label) digital apparatus meets the requirements of the Canadian Interference-Causing Equipment Regulations.

Cet appareil numérique de la Classe A (ou Classe B, si ainsi indiqué sur l'étiquette d'enregistration) respecte toutes les exigences du Reglement sur le Materiel Brouilleur du Canada.

EN 55022 Compliance (Czech Republic Only)

This device belongs to category A devices as described in EN 55022, unless it is specifically stated that it is a category B device on the specification label. The following applies to devices in category A of EN 55022 (radius of protection up to 30 meters). The user of the device is obliged to take all steps necessary to remove sources of interference to telecommunication or other devices.

Pokud nenÌ na typovÈm ötitku poËÌtaËe uvedeno, ûe spad· do t‾Ìdy A podle EN 55022, spad· automaticky do t‾Ìdy B podle EN 55022. Pro za‾ÌzenÌ za‾azen· do t‾Ìdy A (ochrannÈ p·smo 30m) podle EN 55022 platÌ n·sledujÌcÌ. Dojde-li k ruöenÌ telekomunikaËnÌch nebo jinych za‾ÌzenÌ, je uûivatel povinen provÈst takov· opat‾enÌ, aby ruöenÌ odstranil.

CE Notice

Marking by the symbol CE indicates compliance of this tape library to the EMC (Electromagnetic Compatibility) and Low Voltage directives of the European Community. Such marking is indicative that this tape library meets or exceeds the following technical standards:

EN 55022 Limits and Methods of Measurement of Radio Interference Characteristics of Information Technology Equipment.

EN 55024:1998 Information Technology Equipment - Immunity characteristics - Limits and methods of measurement.

EN 61000-3-2 Harmonic current emissions test.

EN61000-3-3 Voltage fluctuations and flicker in low-voltage supply systems test.

EN 61000-4-2 Electrostatic discharge immunity test.

EN 61000-4-3 Radiated, radio-frequency, electromagnetic field immunity test.

EN 61000-4-4 Electrical fast transient/burst immunity test.

EN 61000-4-5 Surge immunity test.

EN 61000-4-6 Immunity to conducted disturbances, induced by radio-frequency fields.

EN 61000-4-8 Power frequency magnetic field immunity test.

EN 61000-4-11 Voltage dips, short interruptions and voltage variations immunity test.

EN 60950: 1999-2004 3rd Edition "Safety of Information Technology Equipment, including Electrical Business Equipment."

EN 60825-1: 1996 "Safety of Laser Products," if applicable.

A Declaration of Conformity in accordance with the preceding standards has been made and is on file at ADIC Europe, ZAC de Basses Auges, 1, rue Alfred de Vigny, 78112 Fourqueux, FRANCE.

VCCI Notices (Japan Only)

For Class B products based on the standard of the Voluntary Control Council for Interference for information technology equipment: If this equipment is used near a radio or television receiver in a domestic environment, it may cause radio interference. Install and use the equipment according to the instruction manual.

> この装置は、情報処理装置等電波障害自主規制協議会（ＶＣＣＩ）の基準に基づくクラスＢ情報技術装置です。この装置は、家庭環境で使用することを目的としていますが、この装置がラジオやテレビジョン受信機に近接して使用されると、受信障害を引き起こすことがあります。
> 取扱説明書に従って正しい取り扱いをして下さい。

For Class A products based on the standard of the Voluntary Control Council for Interference by Information Technology Equipment (VCCI): If this equipment is used in a domestic environment, radio disturbance may occur, in which case, the user may be required to take corrective actions.

この装置は、情報処理装置等電波障害自主規制協議会（ＶＣＣＩ）の基準に基づくクラスＡ情報技術装置です。この装置を家庭環境で使用すると電波妨害を引き起こすことがあります。この場合には使用者が適切な対策を講ずるよう要求されることがあります。

Note that VCCI regulations provide that changes or modifications not expressly approved by the tape library manufacturer could void your authority to operate this equipment.

Declaration of Conformity

The signed Declaration of Conformity is on file with Advanced Digital Information Corporation, 17275 NE 67th Court, Redmond, Washington 98052, and ADIC Europe, ZAC des Basses Auges 1, rue Alfred de Vigny, 78112 Fourqueux, France.

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Description

The FastStor 2 autoloader provides automated data storage, archival, backup, and retrieval for a range of systems from desktop workstations to small office local area networks to storage area networks. The standard product is designed for use in a general office environment, and has a fully finished appearance for use on a desktop; however, it can be installed easily into a rack.

The autoloader contains one drive and 8 fixed storage locations for tape media. There is a single slot door located on the front of the autoloader for inserting and removing tapes. A carousel mechanism is used to move tape within the autoloader, and a robotic picker is used to either move a tape from the carousel to the drive, or from the carousel to the media access door. There is an Operator Panel located on the front of the unit for operator interface.

It is compatible with most operating systems and environments that support the SCSI interface, but requires either direct support from the operating system or a compatible backup application to take full advantage of its many features. For specific information about your autoloader, including autoloader capacity, drive information, and physical size, see **Specifications**.

Features

Your autoloader has the following features:

- **Multi-function Operator Panel**—The autoloader Operator Panel consists of four LEDs, four buttons, and an LCD screen. The Operator Panel provides everything you need to monitor autoloader status and to control all of its functions.

- **Cleaning Cartridge**—Although the cleaning cartridge can occupy a cartridge storage slot in the autoloader (facilitating automated cleaning cycles), manual insertion of a cleaning cartridge is permitted by importing the cleaning cartridge through the Operator Panel.

- **Cartridge Pre-Check**—Whenever you power up your autoloader, it will scan the cartridge storage slots and the drive and then build a log of valid cartridge locations.

- **Reverse Cartridge Protection**—The import/export cartridge storage slot is designed to prevent the cartridges from being inserted incorrectly.

- **Built-in Diagnostics**—Your autoloader includes diagnostic firmware that tells you when drive head cleaning is required, reports diagnostic results, and drive operating status.

- **Barcode Ready**—The available barcode reader option can deliver instant media verification and inventory.

- **Rackmount Ready**—The available rackmount kit enables you to rackmount your autoloader in 2U of rack space.

Switches and Indicators

The following topic illustrates the front, rear, and other operation components for the FastStor 2 autoloader.

Front Panel

Use **Figure 3-1** and **Table 3-1** to identify the front panel components.

Figure 3-1   Autoloader Front Panel
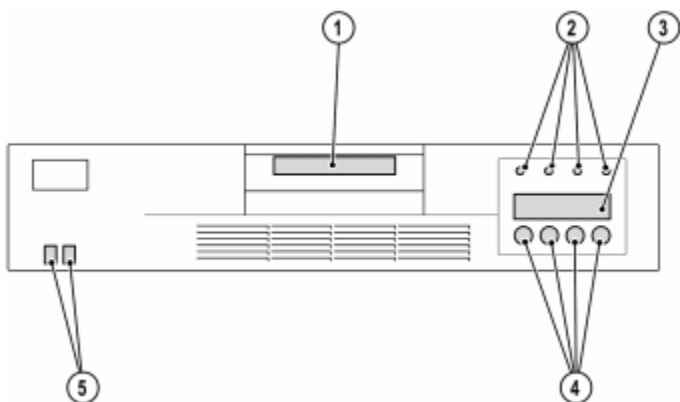
Table 3-1   Front Panel Component Names

Callout	Description
1	Mail slot
2	Front panel LEDs
3	Front panel LCD screen
4	Control buttons
5	Power switch

Rear Panel

Use **Figure 3-2** and **Table 3-2** to identify the rear panel components.

Figure 3-2   Autoloader Rear Panel
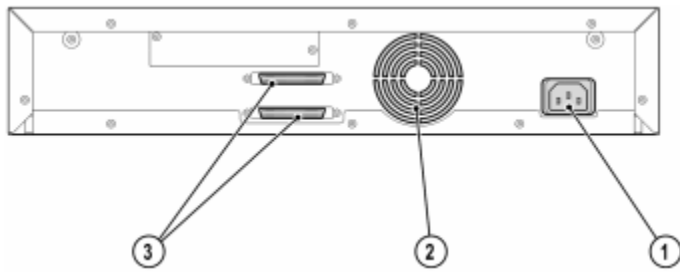
Table 3-2   Rear Panel Component Names

Callout	Description
1	Power connector
2	Fan vent
3	HD68 SCSI Connectors

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Getting Started

This section describes how to install and set up the FastStor 2 autoloader.

Unpacking and Inspecting

Before you begin, clear a desk or table so that you can unpack the autoloader.

⚠ **CAUTION:** **If the room in which you are working differs from the temperature in which the autoloader was shipped or stored by 30° F (15° C) or more, let the autoloader acclimate to the surrounding environment for at least 12 hours before opening the shipping carton.**

Checking the Accessories

The autoloader equipment box includes the following items:

- 1 US power cord
- 1 European power cord
- 1 SCSI Ultra 2 LVD Multimode Terminator
- 1 Documentation CD
- 1 Quick Start Guide (paper copy)

Unpacking the Autoloader

Follow the directions below to unpack the autoloader.

To unpack and inspect the autoloader for shipping damage

1. Clear a table or desk so that you have room to unpack the autoloader.

2. Inspect the shipping box for damage. If you notice any damage, report it to the shipping company immediately.

3. Open the shipping box and remove the accessories package. Set the accessories package aside for now.

4. Lift the autoloader and padding out of the box and place it on the work surface, top facing up.

⚠ **CAUTION:**   **Do not set the autoloader on its end or side.**

5. Carefully remove the shipping padding from the left and right sides of the autoloader. Then remove the bag from the autoloader.

📝 NOTE: Save the packing materials in case you need to move or ship the autoloader in the future.

Choosing an Installation Location

Choose an installation location that meets the criteria in **Table 4-1**. See **Specifications** for more information about autoloader specifications.

Table 4-1   Location Criteria

Requirement	Criteria
Standalone requirements	Select a location that is flat, sturdy, level, and close to a host system server. Do not place the autoloader on the floor or other carpeted surfaces. ⚠ **CAUTION: Do not place the autoloader on its side or upside down or stack items that weigh more than 5 KG (11.02 lbs) on top of the autoloader.**
Room temperature	10-35º C (50-95º F)
Power source	AC power voltage: 100-127 VAC; 200-240 VAC Line frequency: 50-60 Hz. 📝 NOTE: Locate the AC outlet near the autoloader. The AC power cord is the product's main AC disconnect device and must be easily accessible at all times.
Weight	26 lbs (12 kg)
Air quality	Minimal sources of particulate contamination. Avoid areas near frequently used doors and walkways, stacks of supplies that collect dust, printers, and smoke-filled rooms. ⚠ **CAUTION: Excessive dust and debris can damage tapes and tape drives.**
Humidity	20-80% RH

Requirement	Criteria
Clearance	Back Minimum of 15.4 cm (6 inches)
	Front Minimum of 30.8 cm (12 inches)
	Sides Minimum of 5.08 cm (2 inches)

Autoloader SCSI Connections

The autoloader incorporates a wide SCSI-2, Low-Voltage Differential (LVD) SCSI bus, but may also be attached to a Single-Ended (SE) SCSI bus. Make sure your SCSI host system adapter or controller supports these standards. If you connect the autoloader to the SE SCSI bus or if there are SE devices attached to the same SCSI bus, the autoloader's performance is limited to the maximum data transfer speed and maximum cable lengths of the SE bus.

The autoloader is NOT compatible with a standard differential (Diff) or High-Voltage Differential (HVD) SCSI bus. The autoloader is compatible with a narrow (50-pin) SCSI bus using a 68-pin to 50-pin adapter that terminates the unused 18 pins. These adapters are sometimes labeled high-byte termination.

Connecting SCSI and Power Cables

The following describes how to connect the SCSI and power cables.

NOTE: The autoloader is an Ultra-2 Wide device. Only use cables and terminators specified for Ultra-2 use or labeled as MultiMode.

To connect the SCSI and power cables to the autoloader

1. Shut down and turn off the selected server. Turn off all attached devices, such as printers and other SCSI devices. Remove the power cables from the server and all attached accessories.

   CAUTION: **Failure to remove the power cables from these devices could result in damage to the autoloader.**

2. Attach one end of the SCSI cable to one of the connectors on the rear panel of the autoloader.

3. Attach the other end of the SCSI cable to the connector on the SCSI host system bus adapter or to the connector on the previous device on the SCSI bus.
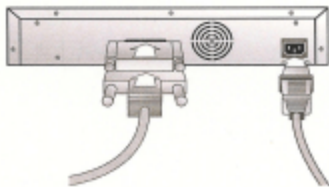
NOTE: If the SCSI cable does not fit the connector on your SCSI host system adapter, you either have an incompatible SCSI host system adapter or you need to purchase a cable adapter, or a different cable. Contact your service representative or your SCSI host system adapter manufacturer for information.

4. Attach the terminator to the remaining SCSI connector on the rear panel of the autoloader (if the autoloader is the last or only device on the SCSI bus). Otherwise, attach the cable to the next device on the SCSI bus. Make sure that the last device on the SCSI bus is properly terminated.

5. Attach the female connector of the power cable to the power connector on the rear panel of the autoloader.

6. Plug in the power cable to the nearest properly grounded power outlet, and then plug in the host server system or workstation and all attached devices.

CAUTION: **To disconnect all power from the autoloader, remove the power cord from the outlet. The power switch only puts the power on stand-by.**

7. Turn on the autoloader by setting the power switch on the front panel to the ON position. You will need to use the tip of a pen or similar item to move the switch to the desired position.

    Check the LCD display to make sure the autoloader is receiving power. If it is not, check the power connections and your power source. During the Power-On Self Test (POST), all four LEDs are illuminated briefly, followed by just the Ready/Activity LED flashing. When the initialization sequence is complete, the LCD screen displays the Home screen.
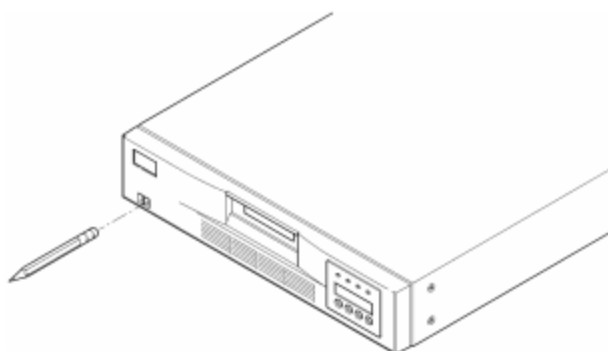
8. Turn on any other devices you turned off earlier, and then turn on the server.

Connecting More than one FastStor 2

If you are connecting more than one autoloader on the same SCSI channel, connect each unit to the previous unit with an additional shielded interface cable. It does not matter which SCSI connector on each autoloader you connect the interface cable to. Each SCSI ID comes predefined with each autoloader. Make sure that you configure each autoloader unit with its unique drive SCSI ID and autoloader ID. Your autoloaders will not function properly if they have the same SCSI IDs, see **Viewing or Changing the SCSI IDs**. Also, ensure that you terminate the last device in the chain.

Preparing the Host System

At this point you need to refer to your software installation guide for instructions on installing the backup/controlling software for the autoloader onto the host system. Read through the **SCSI Host System Adapter and Connection Guidelines** before installing the software.

SCSI Host System Adapter and Connection Guidelines

If necessary, install a SCSI host system adapter, software, and compatible driver(s). Refer to the manuals for the host system and SCSI host system adapter for detailed instructions. In addition, follow these general guidelines:

> NOTE: The LVD host system bus adapter is recommended. A single ended SCSI host system bus adapter does work, but can severely degrade performance. Also, if there are any SE devices on the same SCSI bus, the entire SCSI bus negotiates down to SE speed and can severely degrade performance.

- When the host server system is powered on, install software, and/or driver(s) that are compatible with the autoloader. Most backup software packages require an additional module to communicate with the autoloader robotics.

- If the host server system is connected to a network, check with the system administrator before turning off power.

- Use proper procedures to prevent electrostatic discharge (ESD). Use wrist-grounding straps and anti-static mats when handling internal components.

- Make sure that the host server system has an open expansion slot.

- Make sure that your backup application supports the SCSI host system adapter. Depending on the server configuration, you may need to change the SCSI IDs of the autoloader (see **Viewing or Changing the SCSI IDs**).

- Ensure the autoloader is properly terminated. If the autoloader is the only SCSI device—other than the SCSI host system adapter—on the selected SCSI bus, it must be terminated. Likewise, if the autoloader is physically the last SCSI device on the SCSI bus, it must be terminated. Only the devices physically at the beginning and end of the SCSI bus should be terminated.

- Verify the connection between the autoloader and host system by making sure that the host server system's operating system recognizes the autoloader:

    In Windows NT ™: Settings -> Control Panel -> SCSI Adapter

In Windows 2000™: Settings -> Control Panel -> System -> Hardware -> Device Manager -> Tape Drive and/or Media Changer

For more information on verifying the connection of SCSI devices, consult the operating system documentation.

Installing Optional Hardware

The FastStor 2 autoloader has the following optional hardware that you can install and use:

- Rackmount Kit
- Barcode Reader

Operating the Autoloader

This topic discusses how to operate the following FastStor 2 autoloader components.

Operator Panel

The Operator Panel consists of four LEDs, four buttons, and an LCD screen. The Operator Panel provides everything you need to monitor autoloader status and to control all of its functions.

Normal Display

The display defaults to the Home screen. The Home screen consists of the autoloader status on the top line and the current cartridge inventory on the second line (see **Figure 5-1**).

NOTE: "SEQ" appears next to the front panel inventory when the autoloader is in Sequential mode. Nothing appears when the autoloader is in Random mode.

The cartridge inventory indicates all slots that contain a cartridge by displaying the slot number. Empty slots are indicated by a dash (-).

Figure 5-1 Home Screen, Drive Empty
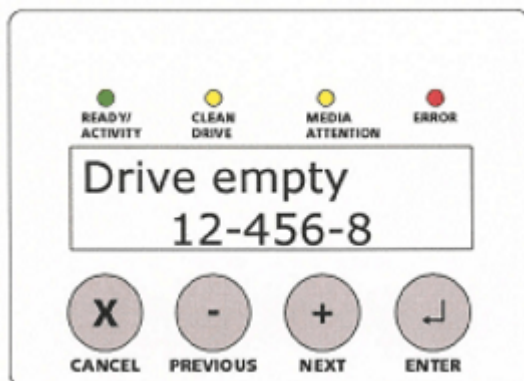
If the tape drive has a cartridge loaded, the top line displays *Drive loaded*. The cartridge currently loaded in the drive is indicated by an alternating black block and the slot number. This display can also indicate that the specified cartridge is being loaded, unloaded, imported, or exported. The autoloader status line indicates the current operation. See **Figure 5-2** for an example.

Figure 5-2   Home Screen, Drive Loaded
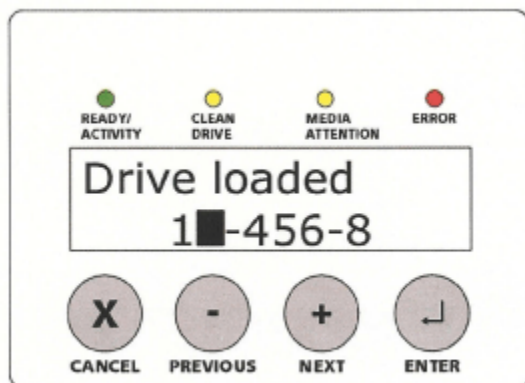
Abnormal Display

An exclamation point (!) displayed in the inventory indicates that the autoloader has identified a cartridge in the indicated slot that is either an invalid cartridge type, or has had a media-related error. These can be caused by faulty media, or dirty read/write heads in the tape drive. The Media Attention LED indicator is also illuminated in this case. See **LED Indicators** for more information.

Exporting the indicated cartridge will clear the error condition. See **Exporting Cartridges**. If these symptoms occur on multiple known good cartridges, consider cleaning the tape drive. See **Cleaning the Tape Drive**. If a particular cartridge causes these symptoms repeatedly, that cartridge may be defective or invalid.

LED Indicators

The Operator Panel includes four LED indicators that provide a variety of information as detailed in the following table.

Table 5-1   LED Indicators

LED	Color	Description
Ready/Activity	Green	Illuminated when power is on. Blinking whenever there is tape drive or autoloader robotics activity.
Clean Drive	Amber	Illuminated when the tape drive has determined that a cleaning cartridge should be used (see **Cleaning the Tape Drive**). Additional cleaning of the tape drive is not necessary.

LED	Color	Description
Media Attention	Amber	Illuminated if the tape drive has detected a cartridge or tape fault. Recommended action is to export the cartridge from the autoloader. Doing so turns off the LED (see **Exporting Cartridges**). If a particular cartridge causes these symptoms repeatedly, that cartridge may be defective.
Error	Red	Illuminated if an unrecoverable tape drive or autoloader error occurs. A corresponding error message appears on the LCD screen (see **Viewing Event Logs**).

Control Buttons

The Operator Panel includes four buttons that provide access to all operations and information menus. **Table 5-2** describes each control button function.

Table 5-2   Control Buttons

Button	Description
Cancel	Cancels the current menu option and returns to the previous menu level or Home screen.
Previous	Selects the previous item or value in the currently displayed menu.
Next	Selects the next item or value in the currently displayed menu.
Enter	Executes the current menu or selects the current option displayed on the LCD panel.

Understanding the Menu Structure

The following graphic depicts the autoloader menu structure.

Figure 5-3 Operator Panel Menu Structure


```
                              ┌──────────────┐
                              │ HOME SCREEN  │
                              └──────────────┘
                                     │
        ┌────────────────────────────┼──────────────────────┐
        │                            │        ┌──────────────┐
  ┌──────────────┐                   │        │ INFORMATION  │
  │   COMMANDS   │                   │        └──────────────┘
  └──────────────┘                   │             │
        │                            │        ┌──────────────┐
  ┌──────────────┐                   │        │ Cycle Count  │
  │    Import    │                   │        └──────────────┘
  └──────────────┘                   │        ┌──────────────┐
  ┌──────────────┐                   │        │View Event Log│
  │    Export    │                   │        └──────────────┘
  └──────────────┘                   │        ┌──────────────┐
  ┌──────────────┐                   │        │ Product Rev  │
  │Load Cartridge│                   │        └──────────────┘
  └──────────────┘                   │        ┌──────────────┐
  ┌──────────────┐                   │        │ Firmware Rev │
  │Unload Cartridge│                 │        └──────────────┘
  └──────────────┘          ┌──────────────┐
  ┌──────────────┐          │CONFIGURATION │
  │ Clean Drive  │          └──────────────┘
  └──────────────┘               │
  ┌──────────────┐          ┌──────────────┐
  │ Re-inventory │          │    Reset     │
  └──────────────┘          └──────────────┘
                            ┌──────────────┐
  ┌──────────────┐          │Change SCSI ID│
  │  DIAGNOSTIC  │          └──────────────┘
  └──────────────┘          ┌──────────────┐
        │                   │ Code Update  │
  ┌──────────────┐          └──────────────┘
  │ SYSTEM TEST  │          ┌──────────────┐
  └──────────────┘          │Circular Mode*│
                            └──────────────┘
                            ┌──────────────┐
                            │Autoload Mode*│
                            └──────────────┘
```

*Circular and Autoload Mode are only available when the autoloader is in "Sequential" mode.
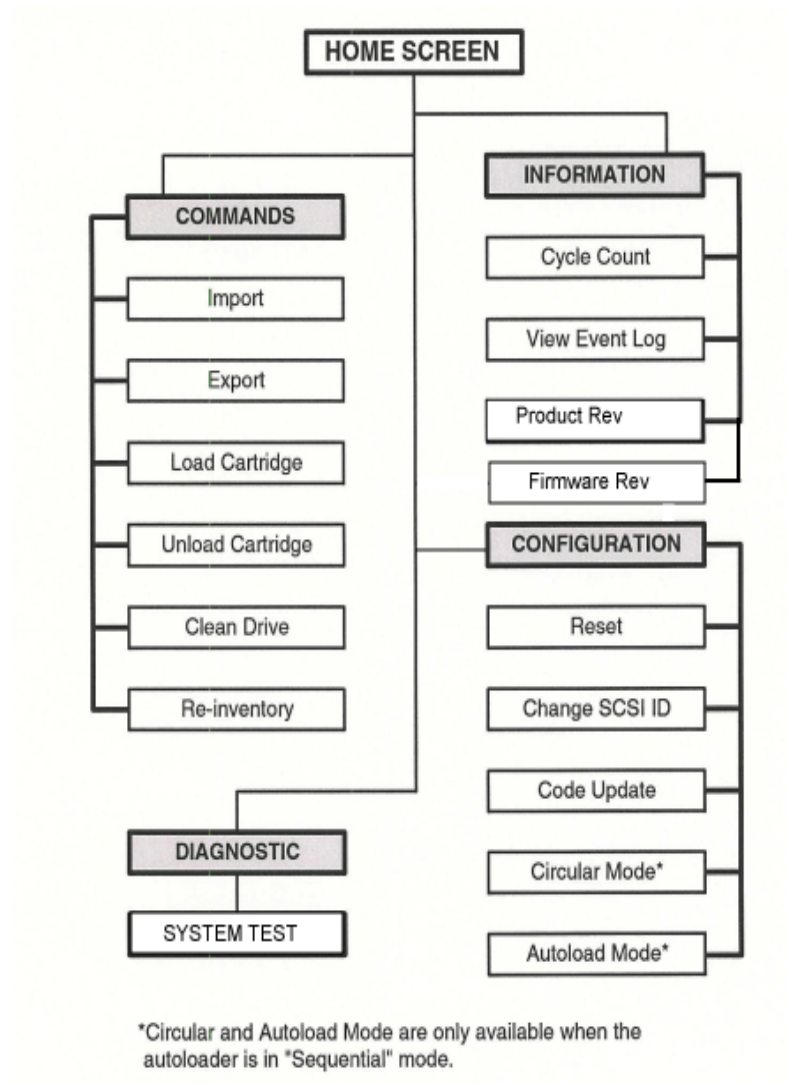
Powering on the Autoloader

To power-on the autoloader

- Use the eraser end of a pencil or something similar to press the left side of the power switch.
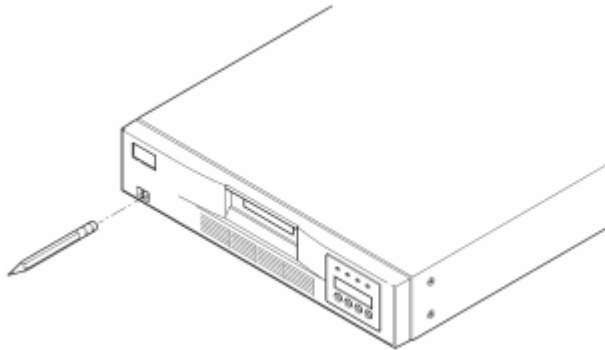
The autoloader powers up.

Working with Data Cartridges

The following describes how to work with your data cartridges. For specific information about allowed autoloader data cartridges, see **Specifications**.

Importing Cartridges

This option commands the autoloader to import a cartridge into a specific empty slot on the carousel.

> ⚠️ **CAUTION:** **Performing an import or export of media during a data backup may result in adverse results, which could include backup failure or other errors.**

To import tapes into the autoloader

1. Make sure the write-protect switch is set as desired for each data cartridge (see **Write-Protecting Cartridges**).

2. From the Home Screen or main menu, press **+** or **–** until **Command** appears on the top line of the LCD screen.

3. Press **ENTER** to access the available options.

4. Press **+** or **–** until the *Import* message appears on the LCD screen. Press **ENTER** to select.

5. Press **+** or **–** until the desired slot number appears on the LCD screen and press **ENTER**.

   You are not given the option to import a cartridge to an occupied slot.

6. When the *Insert Cartridge Slot* message appears on the LCD screen and the mail slot opens, insert the desired data cartridge into the mail slot so that the write-protect switch is facing out from the autoloader.

NOTE: If you are using the Operator Panel to clean the drive, import the cleaning cartridge only when the Operator Panel requests it. You may keep a cleaning cartridge in the autoloader if the backup software can manage the drive cleaning.

7. Repeat steps 5 and 6 as needed for any additional cartridges, and then press **CANCEL** when you are done importing cartridges.

8. Verify that the LCD screen shows that the desired slots have cartridges installed.

Exporting Cartridges

This option moves a cartridge from a specific slot to the mail slot.

CAUTION: **Performing an import or export of media during a data backup may result in adverse results, which could include backup failure or other errors.**

To export cartridges from the autoloader

1. From the Home Screen or main menu, press **+** or **–** until **Commands** appears on the top line of the LCD screen. Press **ENTER**.

2. Press **+** or **–** until the *Export* message appears on the LCD screen. Press **ENTER**.

3. Press **+** or **–** until the desired slot number appears on the LCD screen. Press **ENTER**. You are not given the option to export from an empty slot, and you cannot export directly from the drive.

4. When the *Remove Cartridge* message appears on the LCD screen and the cartridge is ejected through the mail slot, remove the exported cartridge from the autoloader, and press **ENTER**.

5. Repeat steps 3 and 4 as needed for any additional cartridges.

6. Press **CANCEL** when you are done exporting cartridges.

7. Make sure the LCD screen indicates that the desired slots contain cartridges.

Loading Cartridges

This option loads a cartridge from the autoloader slots into the tape drive.

To load cartridges

1. From the Home Screen or main menu, press **+** or **–** until **Commands** appears on the top line of the LCD screen. Press **ENTER** to select.

2. Press **+** or **–** until the *Load Cartridge* message appears on the LCD screen.

3. Press **ENTER** to select.

4. Press **+** or **–** until the desired slot number appears on the LCD screen and press **ENTER**. The slot number you select indicates the cartridge to be loaded into the tape drive.

NOTE: Only slot numbers that contain cartridges are displayed.

While cartridges are loading, status messages appear on the LCD screen. When the operation is complete, the *Drive Stopped* message appears.

5. Repeat for all cartridges you want to load (up to 8 cartridges).

Unloading Cartridges

This option unloads the cartridge from the tape drive into its original slot.

To unload cartridges

1. From the Home Screen or main menu, press **+** or **–** until **Commands** appears on the top line of the LCD screen.

2. Press **ENTER** to select.

3. Press **+** or **–** until the *Unload Cartridge* message appears on the LCD screen.

4. Press **ENTER** to unload the cartridge from the tape drive.

    When the cartridge is unloading, status messages appear on the LCD screen. When the operation is complete, the *Drive Empty* message appears.

5. Repeat for all cartridges you want to unload.

Write-Protecting Cartridges

All cartridges have a write-protect switch to prevent accidental erasure or overwriting of data. Before loading a cartridge into the autoloader, make sure the write-protect switch on the front of the cartridge is positioned as desired. Slide the switch to the right to write-protect the cartridge.

- For LTO-1 cartridges, a small, orange padlock is visible when the cartridge is write-protected. See **Figure 5-4** for the location of the switch on an LTO data cartridge.

- For LTO-2 cartridges, a red padlock is visible when the cartridge is write-protected. See **Figure 5-4** for the location of the switch on an LTO data cartridge.

- For Super DLTtape 1 cartridges, an orange rectangle is visible when the cartridge is write-protected. See **Figure 5-5** for the location of the switch on an Super DLTtape 1 data cartridge.

Slide the switch to the left to allow the autoloader to write updates to the tape.

- The write-protect switch displays a black void when the cartridge permits overwriting and erasure.

NOTE: When a write-protected cartridge is loaded into the drive, a WP appears on the bottom line of the LCD screen next to the inventory information. This message appears until the cartridge is unloaded from the drive.

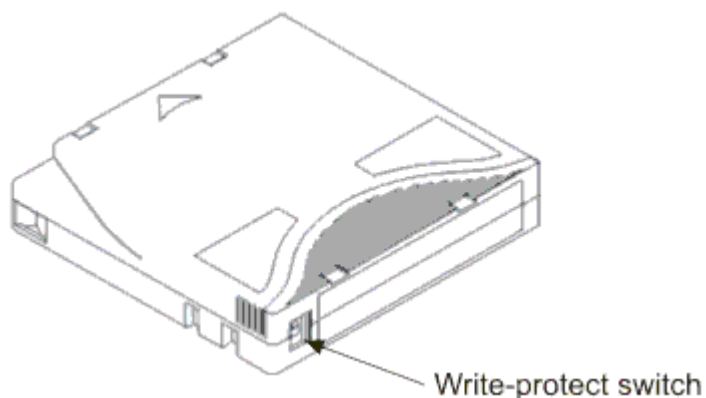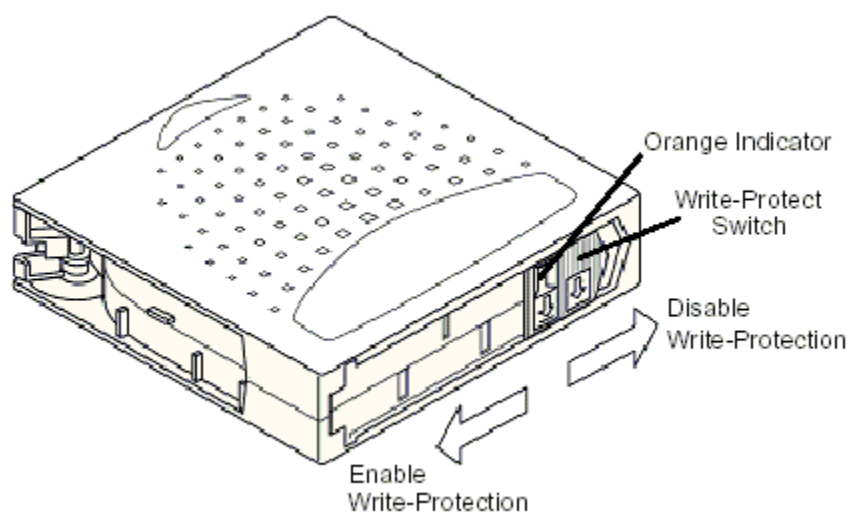**Figure 5-4** Write-Protect Switch on an LTO-1/LTO-2 Cartridge

Write-protect switch

Figure 5-5 Write-Protect Switch on an Super DLTtape 1 Cartridge

Orange Indicator

Write-Protect Switch

Disable Write-Protection

Enable Write-Protection

Maintaining Cartridges

To ensure the longest possible life for all of your cartridges, follow these guidelines:

- Post procedures that describe proper media handling.

- Ensure that anyone who handles tape has been properly trained to handle it.

- Do not drop or strike a cartridge. Excessive shock can damage the internal contents of the cartridge, or the cartridge case itself, making that cartridge unusable.

- Do not expose your cartridges to direct sunlight or sources of heat, including portable heaters and heating ducts.

- Do not stack cartridges more than five high.

- The operating temperature range for LTO-1/LTO-2 cartridges is 10 to 35 degrees C. The storage temperature range is 16 to 32 degrees C in a dust-free environment in which relative humidity is always between 20% and 80% (non-condensing). For Super DLTtape 1 cartridges, refer to the cartridge reference card supplied with each cartridge for temperature and humidity ranges.

- If a cartridge has been exposed to temperatures outside the ranges specified above, stabilize the cartridge at room temperature for the same amount of time it was exposed to extreme temperatures or 24 hours, whichever is less.

- Do not place cartridges near sources of electromagnetic energy or strong magnetic fields, such as computer monitors, electric motors, speakers, or X-ray equipment. Exposure to electromagnetic energy or magnetic fields can destroy data and the embedded servo code, written on the media by the cartridge manufacturer, rendering the cartridge unusable.

- Place identification labels only in the designated slot on the cartridge.

- If you ship a cartridge, ship it in its original or better packaging.

- Do not insert damaged cartridges into the drive.

- Do not touch the tape or tape leader.

- Do not degauss a cartridge that you intend to reuse.

Cleaning the Tape Drive

When the Clean Drive LED is on, the autoloader's tape drive needs to be cleaned. Cleaning times can range from a few seconds to a few minutes during which time the Ready LED blinks. Use only authorized cleaning cartridges in the autoloader.

> NOTE: If you are using the Operator Panel commands to clean the drive, import the cleaning cartridge only after you have selected the Clean Drive command. If you would like to keep a cleaning cartridge in the autoloader, the backup software must manage drive cleaning.

To clean the tape drive

1. From the Home Screen or main menu, press **+** or **–** until **Commands** appears on the top line of the LCD screen.

2. Press **ENTER**.

3. Press **+** or **–** until the *Clean Drive* message appears on the LCD screen, and then press **ENTER**.

4. If the carousel is full, the LCD screen displays the *No slot free for transfer* message. Press **CANCEL** repeatedly until the main menu or Home Screen is displayed. Export a cartridge to make room for the cleaning cartridge.

   See **Exporting Cartridges** for instructions then return to Step 1 to clean the tape drive.

5. Insert the cleaning cartridge into the autoloader mail slot. During the cleaning process, which can take several minutes, the LCD screen displays the *Drive Cleaning* message.

CAUTION: If the cartridge is not a valid cleaning cartridge, the LCD screen will display the *Invalid Tape* message and the cartridge will be exported.

6. When tape drive cleaning is complete, the Clean Drive LED indicator turns off (if previously on) and the autoloader unloads and exports the cleaning cartridge. Remove the cleaning cartridge, and press **ENTER** when the LCD screen prompts you to do so.

NOTE: If the Clean Drive or Media Attention LED indicators illuminate when you insert another cartridge immediately after cleaning, then see **Table 7-1** in **Troubleshooting and Diagnostics**.

7. If you had to remove a data cartridge to import the cleaning cartridge, import the tape to its original slot. See **Importing Cartridges** for more information.

Re-Inventory of Cartridges

This option analyzes the slots and drives in the autoloader.

NOTE: This command is only needed if the inventory in the autoloader is different than the inventory displayed on the operator panel.

To update the inventory information

1. From the Home Screen or main menu, press **+** or **–** until **Commands** appears on the top line of the LCD screen.

2. Press **ENTER** to access the available options.

3. Press **+** or **–** until the *Re-inventory* message appears on the LCD screen.

4. Press **ENTER**.

   The autoloader then checks the drive and each cartridge slot for the presence of a tape in order to update the inventory information.

6

Managing the Autoloader

This section discusses managing the autoloader, including resetting the autoloader, setting SCSI IDs, setting the autoloader mode, and updating firmware. You can also use the System Test (see **Using System Test**) and the information retrieval tool (see **Retrieving Information**) to manage the FastStor 2.

Resetting the Autoloader

This option resets the autoloader robotics and the tape drive within the autoloader, forces a new cartridge inventory, and clears any current error condition.

NOTE: This option is primarily used if the autoloader is in an error state.

To reset the autoloader

1. From the Home Screen or main menu, press **+** or **–** until **Configuration** appears on the top line of the LCD screen.

2. Press **ENTER** to select.

3. Press **+** or **–** until the *Reset* message appears on the LCD screen.

4. Press **ENTER** to reset the autoloader.

   After initialization, the autoloader returns to normal operation and displays the Home screen.

Viewing or Changing the SCSI IDs

Use this option to view or change the SCSI IDs used by the autoloader. The autoloader occupies two SCSI IDs, one ID is assigned to the autoloader and the second ID is assigned to the tape drive.

The default SCSI ID for the autoloader's SCSI controller is 0. The default SCSI ID for the tape drive is 5. You only need to change a SCSI ID if there is another device, or devices, already assigned to these IDs.

NOTE: If you changed the SCSI ID, you may also need to cycle power on the host system and reconfigure your backup software before you can use the autoloader. Consult your hardware and software manuals for more information.

Viewing or Changing the Autoloader SCSI ID

Use the following procedure to view or to modify the autoloader SCSI ID.

To change the autoloader SCSI ID

1. From the Home Screen or main menu, press **+** or **–** until **Configuration** appears on the top line of the LCD screen.

2. Press **ENTER** to select.

3. Press **+** or **–** until the *Change SCSI ID* message appears on the top line of the LCD screen.

4. Press **ENTER** to select.

5. Press **+** or **–** until the *Loader* message appears on the bottom line of the LCD screen and then press **ENTER** to select.

6. Press **+** or **–** until the desired SCSI ID is displayed. Press **ENTER**. Press **CANCEL** to view only.

    The *Cycle Power for New SCSI ID* message appears on the LCD screen if you have made a change.

7. Turn off the autoloader. After a few seconds, turn it back on again.

    The selected SCSI ID is now in effect.

Viewing or Changing the Tape Drive SCSI ID

Use the following procedure to view or to modify the tape drive SCSI ID.

To change the tape drive SCSI ID

1. From the Home Screen or main menu, press **+** or **–** until **Configuration** appears on the top line of the LCD screen.

2. Press **ENTER** to select.

3. Press **+** or **–** until the *Change SCSI ID* message appears on the top line of the LCD screen.

4. Press **ENTER** to select.

5. Press **+** or **–** until the *Drive* message appears on the bottom line of the LCD screen.

6. Press **ENTER** to select.

7. Press **+** or **–** until the desired SCSI ID is displayed, and then press **ENTER**. Press **CANCEL** to view only.

    The *Cycle Power for New SCSI ID* message appears on the LCD screen if you have made a change.

8. Turn off the autoloader, and then after a few seconds, turn it back on again.

    The selected SCSI ID is now in effect.

Autoloader Operating Modes

The autoloader has operational modes that affect how the autoloader loads tapes into the drive. The operating mode is set based on whether you have automation software controlling cartridges in the autoloader or if you are manually loading and unloading cartridges using the autoloader Operator Panel controls.

The autoloader always operates in Autodetect mode. In Autodetect, the autoloader automatically assumes you are not using automation software to control cartridge or drive activity. This mode is called Stacker or Sequential mode. If the autoloader detects that the automation software is controlling tape drive activity, it will automatically switch to Random mode.

NOTE: "SEQ" appears next to the front panel inventory when the autoloader is in Sequential mode. Nothing appears when the autoloader is in Random mode.

Random Mode

This is the mode of operation when a backup software application is being used. In Random mode, the autoloader will not automatically load tapes into the drive. Instead it waits for commands from the software. Your backup software must support autoloaders, which often requires the additional installation of an autoloader/library software module.

Sequential Mode

Sequential mode is useful when a software application is not available. In Sequential mode, the autoloader will automatically unload and load tapes from the drive. The operator determines the first tape to load by loading the desired tape into the tape drive using the autoloader Operator Panel controls (see **Loading Cartridges** for instructions). When the first tape is full or unloaded for any reason, the autoloader automatically removes the tape from the drive, puts it in its original slot, then loads the next available higher numbered slot. To further determine how you want tapes loaded into the autoloader's tape drive while in Sequential mode, you can view or set Circular and Autoload options from the autoloader front panel, but only while in Sequential mode.

Circular Mode On/Off

This option turns Circular mode on or off, and is only available when in Sequential mode. When Circular mode is on, after the autoloader has cycled through all available cartridges, it then reloads the original first cartridge in the sequence. If Circular mode is turned off and the last cartridge has been unloaded, the autoloader stops loading cartridges until you manually load another cartridge.

CAUTION: **Use caution when choosing Circular mode. This mode makes it possible to overwrite data previously written on cartridges.**

To turn the Circular mode On or Off

1. From the Home Screen or main menu, press **+** or **–** until **Configuration** appears on the top line of the LCD screen.

2. Press **ENTER** to select.

3. Press **+** or **-** until the *Circular Mode* message appears on the LCD screen.

The second line on the LCD screen indicates the current status, either On or Off.

4. Press **ENTER**.

The LCD screen indicates whether you are about to turn Circular Mode on or off.

5. Press **ENTER** to accept the change to Circular Mode, or press **CANCEL** to exit and not save the changes.

Autoload Mode On/Off

This option turns Autoload mode on or off, and is only available when in Sequential mode. When Autoload mode is on, the autoloader automatically loads the cartridge from the lowest numbered full slot into the tape drive when the system is first turned on (first cartridge only). When Autoload mode is off, you must load cartridges into the drive manually. This function is only applicable when you power up the system.

To turn the Autoload mode On or Off

1. From the Home Screen or main menu, press **+** or **–** until **Configuration** appears on the top line of the LCD screen.

2. Press **ENTER** to select.

3. Press **+** or **–** until the *Autoload Mode* message appears on the LCD screen.

The second line on the LCD screen indicates the current status, On or Off.

4. Press **ENTER**. The LCD screen indicates whether you are about to turn Autoload Mode on or off.

5. Press **ENTER** to accept the change to Autoload Mode, or press **CANCEL** to exit and not save the changes.

Updating Firmware

You can update both drive and autoloader firmware. (The term "autoloader firmware" includes both the SCSI controller firmware and the robotics controller firmware.)

You can use the Library Management Tool to update both the drive and the autoloader firmware. Alternatively, you can use a firmware upgrade tape to update drive firmware. There are no alternate options to update autoloader firmware.

> ⚠️ **CAUTION:** **Do not power cycle or reset the autoloader during an upgrade process. Doing so can cause the autoloader to become inoperable.**

Using the Library Management Tool

The Library Management Tool enables you to view your autoloader and drive VPD settings, download firmware to your autoloader and drive, and run diagnostic tests on your unit.

The Library Management Tool is available at **www.adic.com** or through ATAC (see **Contacting ATAC**).

Using a Firmware Upgrade Tape

This option performs a firmware code update to the drive using a firmware upgrade tape previously created using a separate procedure.

> 📝 NOTE: This code update operation assumes that the upgrade tape is imported as part of this procedure. Do not import the firmware update cartridge before starting this procedure.

To upgrade firmware with a firmware upgrade tape

1. From the Home Screen or main menu, press **+** or **–** until **Configuration** appears on the top line of the LCD screen.

2. Press **ENTER** to select.

3. Press **+** or **–** until the *Code Update* message appears on the LCD screen, and then press **ENTER** to select.

4. If the carousel is full, do the following:

   • When the LCD screen displays the *No slot free for transfer* message, press **CANCEL** repeatedly until the main menu or Home Screen is displayed.

   • Export a cartridge to make room for the firmware update cartridge (see **Exporting Cartridges** for instructions), and then return to step 1 to update the firmware.

5. If the carousel is not full, do the following:

   • The autoloader selects the first available slot and prompts you to insert the code update tape.

6. Insert the firmware upgrade tape into the mail slot.

7. During the firmware update, which can take several minutes, the *Drive SW update busy...* message appears on the LCD screen. When firmware update is complete, the autoloader resets, then unloads and exports the code update cartridge. Remove the code update cartridge and press **ENTER** when the LCD screen prompts you to do so.

8. If you exported a data cartridge to make room for the code update cartridge, be sure to import the cartridge to its original slot.

   See **Importing Cartridges** for instructions.

> 📝 NOTE: After a firmware update, the firmware revision displayed on the LCD will not be updated until the autoloader is power cycled.

Using System Test

The System Test option cycles the autoloader through the process of loading, calibrating, and unloading all cartridges in the carousel.

Running a System Test

Running a System Test verifies the basic operational soundness of the autoloader and tape drive. All regular backup or restore operations are suspended while a System Test is in progress.

To run a System Test

1. From the Home Screen or main menu, press **+** or **–** until **Diagnostics** appears on the top line of the LCD screen.

2. Press **ENTER** to select.

   System Test appears on the LCD screen.

3. The *Select Cycles* message appears. Press **+** or **–** to select from 270, 540, 1080, or Endless.

4. Press **ENTER** to begin the test.

   The *Test Count* message displays the number of load-calibrate-unload cycles that have been completed during the test.

5. Press **CANCEL** to end the test.

Retrieving Information

The Information menu provides access to information about the autoloader cycle count, recent events that occurred on the autoloader, and to the firmware level.

Displaying Cycle Count

This option displays the total system cycle count, which increments each time a tape is loaded into the drive or exported from the autoloader.

To display the cycle count

1. From the Home Screen or main menu, press **+** or **–** until **Information** appears on the top line of the LCD screen.

2. Press **ENTER** to access the available options.

3. Press **+** or **–** until the *Cycle Count* message appears on the LCD screen.

   The LCD screen displays the total cycle count.

4. Press **CANCEL** when done.

Viewing Event Logs

This option provides access to the autoloader errors and events (see **Viewing Autoloader Error Codes** for a description of error codes).

To view the event log

1. From the Home Screen or main menu, press **+** or **–** until **Information** appears on the top line of the LCD screen.

2. Press **ENTER** to access the available options.

3. Press **+** or **–** until the *View Event Log* message appears on the LCD screen.

   The LCD screen also displays the errors and events currently stored in the event log.

4. Press **ENTER** to access logged events.

   NOTE: The most recent entry is number 0 and older entries are negative numbers.

5. Press **+** or **–** to display each event in the log.

6. Press **CANCEL** when done.

The format for the error or event log is displayed as:

   Event: **24** (occurance number)
   3 (type) **2** (identifier) **A0** (autoloader error number)

Up to 64 entries can be stored in the log. The **occurance** number describes the specific event entry. The most recent entry is 0 and older entries are shown as negative numbers.

The **type** values range from 1 to 5:

1. Internal robotic command message received by RobCtrl Module

2. Internal robotic command message received by RobCtrl Module

3. Indicates an error message

4. Represents motion script information

5. Indicates debug output.

Typical i**dentifier** values range from 1 to 2:

1. Robotic control messages

2. Robotic test messages.

Refer to **Viewing Autoloader Error Codes** for descriptions of the possible **autoloader error numbers** generated in the log.

Viewing Firmware Levels

At any time, you can display the current versions of firmware for the overall product as well as the individual firmware versions on the system.

Displaying Product Version

This option displays the overall product firmware version installed on the autoloader.

To view the product version

1. From the Home Screen or main menu, press **+** or **–** until **Information** appears on the top line of the LCD screen.

2. Press **ENTER** to access the available options.

3. Press **+** or **–** until the *Product Rev* message appears on the LCD screen.

> 📝 NOTE: There are two elements of firmware information that are displayed in this order: drive code version, autoloader version.
>
> To get system firmware information, follow both the Product and the Firmware Version procedures described here.

4. Press **CANCEL** when done.

Displaying Firmware Version

This option displays the version of the firmware currently installed on the autoloader (individual firmware versions on the system).

To view the firmware version

1. From the Home Screen or main menu, press **+** or **–** until **Information** appears on the top line of the LCD screen.

2. Press **ENTER** to access the available options.

3. Press **+** or **–** until the *Firmware Rev* message appears on the LCD screen.

   The LCD screen displays the revision of the firmware currently installed in the autoloader.

> 📝 NOTE: There are three firmware images in the autoloader. The revision information for these images is displayed on the bottom line of the LCD display in this order: Drive, Autoloader SCSI Controller, and Autoloader Robotics Controller.

4. Press **CANCEL** when done.

7

Troubleshooting and Diagnostics

This section contains information on troubleshooting and diagnosing your autoloader.

Installation Issues

Problems encountered during the installation of the autoloader are usually caused by improper SCSI bus configuration, application software configuration errors, or by an incorrectly configured operating system. If the application software that you are using is not communicating with the autoloader after installation, check the following:

- **SCSI ID**—The autoloader uses one SCSI ID for the tape drive and one SCSI ID for the autoloader robotics. Depending on other devices attached to the same SCSI bus and their SCSI IDs, you may need to change the SCSI ID of the autoloader or tape drive before you can use the autoloader. Review the manuals for the other devices on the SCSI bus or your operating system to determine which SCSI IDs are currently in use. See **Viewing or Changing the SCSI IDs** for instructions about changing the autoloader SCSI IDs.

- **SCSI Cabling**—Verify that all SCSI cables are securely connected at both ends. Check the length and integrity of your SCSI cabling. The total length of all cables connected to a SCSI bus must not exceed 19 feet (6 meters) for a SCSI-1 SE bus, 10 feet (3 meters) for a Fast SCSI (Narrow or Wide) or an Ultra SCSI (Narrow or Wide) SE bus, 40 feet (12 meters) for an LVD bus with multiple devices, or 82 feet (25 meters) for an LVD bus with a single device. The length of the internal SCSI cabling inside the autoloader is 2 feet (60 cm). This length must be included in any calculations of cable length.

- **Termination**—If the autoloader is the only SCSI device—other than the SCSI host system adapter—on the selected SCSI bus, it must be terminated. Likewise, if the autoloader is physically the last SCSI device on the SCSI bus, it must be terminated. Only the devices physically at the beginning and end of the SCSI bus should be terminated. Refer to the manuals supplied with other devices on the SCSI bus for information on enabling or disabling termination on those devices. To terminate the autoloader, locate the terminator in the accessories package and press it firmly into either of the two SCSI connectors on the rear panel of the autoloader. Secure the terminator by tightening the finger-screws until snug. The supplied terminator is "dual mode" and will work on both Low-Voltage Differential (LVD) and Single Ended (SE) SCSI buses. Check all SCSI and power connections and confirm that the unit is attached to a valid SCSI SE or LVD bus.

- **Compatibility**—Ensure that the autoloader is compatible with the SCSI host system adapter and backup application you plan to use. For a list of compatible SCSI adapters and application software, check with your SCSI host system adapter manufacturer, backup application vendor, or with Support (see **Getting Help**).

> ![NOTE icon] **NOTE:** ADIC recommends LVD components. A single ended SCSI host system bus adapter will work, but will severely degrade performance. Also, if there are any SE devices on the same SCSI bus, the entire SCSI bus will negotiate down to SE speed and severely degrade performance.

- **Backup Application Installation**—Refer to the documentation included with your backup application for instructions on how to verify proper installation. Most backup software packages require an additional module to communicate with the autoloader robotics.

> ![NOTE icon] **NOTE:** Many backup applications use their own drivers for the autoloader and drive. Before installing a driver, make sure it will not be in conflict with the software.

- **Device Driver Installation**—Make sure that the proper device driver, if applicable, is installed for the autoloader. Contact your support representative for more information.

Troubleshooting Matrix

Table 1 describes troubleshooting problems and solutions encountered with the autoloader power source, tape media, cleaning equipment, and SCSI commands.

Table 7-1   Troubleshooting Table

Problem	Solution
Power	
Autoloader does not power on	• Check all power cord connections. • Make sure the power switch on the front panel is in the ON position. • Make sure there is power to the outlet. Try another working outlet. • Replace the power cord. • Contact your service representative.
No display messages appear	• Make sure the power cord is connected. • Make sure the power switch is on. • Power cycle the autoloader. • Download autoloader firmware. • Contact your service representative.

Problem	Solution
Tape Movement	
Tape stuck in drive	• Power cycle the autoloader, allow it to complete initialization, which in rare cases can take as long as 10 minutes, and then retry unloading the tape using the autoloader Operator Panel controls. • Allow the tape drive to complete all operations. This may take as long as ten minutes if you reset or cycle power on the autoloader while the cartridge is positioned at the physical end of the media. • Make sure that the backup software is not reserving the slot or preventing the tape drive from ejecting the cartridge. The backup software needs to cancel the reservation and any hold it has on the tape drive. • Temporarily disconnecting the autoloader from the host server system eliminates the host system and its software as a problem source. • Contact your service representative.
Tape stuck in storage slot	• See **Removing Stuck Cartridges From Slots**.
Media	
Media barcode labels are not being read	• Make sure the barcode labels are applied in the correct orientation on the cartridge. • Make sure the barcode reader cable is fully seated in the receptacle on the autoloader. • If problem continues, contact your service representative.
Cleaning or data cartridge incompatible with drive	• Make sure you are using cleaning and data cartridges that are compatible with the drive. The autoloader automatically unloads incompatible cartridges to their original slots, the Media Attention LED flashes, and an exclamation point (!) appears in the inventory display for the indicated slot number.

Problem	Solution
Cannot write to or read from tape	• Make sure that the cartridge is write enabled (move the write-protect switch to the enabled position). • Make sure that the cartridge has not been written using an incompatible format. • Make sure that the cartridge is an acceptable format for your drive type (see **Specifications**). • Make sure that the cartridge has not been exposed to harsh environmental or electrical conditions and is not physically damaged in any way. • Many backup applications do not read or write to cartridges that were created using a different backup application. In this case, you may have to perform an erase, format, or label operation on the cartridge. • Make sure you understand any data protection or overwrite protection schemes that your backup application may be using, which could prevent you from writing to a given cartridge. • Retry the operation with a different, known good tape. • Clean the tape drive. See **Cleaning the Tape Drive**.
SCSI ID	
Changed drive SCSI ID, but the host server system does not recognize the new ID	• Make sure that all SCSI devices on the same bus have unique ID numbers. • If the SCSI bus is narrow (50-pin) only SCSI IDs 0 through 7 are available. • Make sure that you cycle power on the autoloader after changing the SCSI ID. • Reboot the host server system.

Problem	Solution
Autoloader Performance	
The autoloader is not efficiently backing up data	• Check the network bandwidth from the host system. If you are backing up data over a network, consider comparing to a local-only backup. • Make sure the autoloader and tape drive are on their own SCSI bus and not daisy-chained to another tape drive or to the hard drive being backed up. • Make sure the autoloader is connected to a LVD SCSI bus and there are no SE devices on the same bus, because this will cause the entire bus to negotiate down to SE speed. • Clean the tape drive. See **Cleaning the Tape Drive** for instructions. • Try a new cartridge. A marginal cartridge can cause performance problems due to bad spots on the tape requiring retries. • Backing up compressed data will lower performance. • Check the size of the files. Small file size can impact performance. • Confirm that the backup application is utilizing block sizes of at least 32KB, preferably 64KB. Refer to the backup application documentation for details.
Cleaning	
Cannot load the cleaning cartridge	• Make sure you are using an allowed cleaning cartridges (see **Specifications**). • Contact your service representative.
Media Attention LED Issues	
Contamination by loose debris	• Avoid contamination by ensuring that the autoloader is installed in a clean, contamination-free environment. Cartridges should be stored vertically in their plastic cases. Continue cleaning the tape drive as needed.
Contamination by head staining (Caused by adhesion of chemicals that are present in the tape media to the head surface)	• One or two passes with a cleaning cartridge should resolve the Media Attention LED caused by normal head staining. If a cleaning cartridge is unsuccessful in resolving a cleaning light after 3 or more attempts, the cleaning cartridge may be contaminated and should NOT be used in another drive.
Non-acclimated media	• A cartridge should be acclimated for at least 24 hours before being used, particularly if it has been stored at a substantially different temperature or level of humidity than the autoloader.

Problem	Solution
Cleaning cartridge is incompatible	• Make sure you are using an allowed cleaning cartridges (see **Specifications**).
Expired cleaning cartridge	• Verify the number of cleanings per cleaning tape for your media type (see **Specifications**).

Bad/defective/contaminated media	• If the Media Attention LED is cleared and the drive has been cleaned, and then immediately reappears each time a particular cartridge is reloaded, that cartridge should be suspected as being defective, if it is not an invalid cleaning cartridge.
	
	    • If this occurs, export the cartridge and load a known good cartridge. In some cases, a cartridge can be worn out, have a defective cartridge memory, or have been formatted as a Firmware Upgrade Tape.
	
	    • Any cartridge that is suspected of being defective or contaminated should NOT be reused in any drive.

Errors Displayed on Front Panel

"!" in autoloader operator panel inventory display	• See **Operating the Autoloader** for more information.
There is an error code on the LCD display	• Look up the error code, try to resolve the failure, and power cycle (see **Viewing Autoloader Error Codes**).

Device Not Detected on SCSI Bus

Connected to a high voltage differential SCSI bus/host system adapter	• Attach device to a LVD SCSI host system adapter/bus. • SCSI cable length exceeded, use shorter cable, or remove other devices from the bus. Device not properly terminated (see **Installation Issues**). • Power on device before powering on the host system. • Check that the device has been powered on and is not in an error state.

SCSI Errors

Connected to a high voltage differential SCSI bus/host system adapter	• Attach device to a LVD SCSI host system adapter/bus. • SCSI cable length exceeded, use shorter cable, or remove other devices from the bus (see **Installation Issues**). • Device not properly terminated.

Problem	Solution

SCSI ID

Changed drive SCSI ID, but the host server system does not recognize the new ID	• Make sure that all SCSI devices on the same bus have unique ID numbers. • If the SCSI bus is narrow (50-pin) only SCSI IDs 0 through 7 are available. • Make sure that you cycle power on the autoloader after changing the SCSI ID. • Reboot the host server system.

Removing Stuck Cartridges From Slots

If the autoloader experiences a severe mechanical problem or if you need to remove cartridges because of a power failure or other circumstance in which the autoloader is unable to export the cartridges in the carousel, follow these steps.

📝 NOTE: Contact your support representative if a cartridge is stuck in the drive.

To remove stuck cartridges from slots

1. Move the power switch on the front panel to the OFF position.

   You may need to use the tip of a pen or similar item to move the power switch.

2. Remove the power cable and SCSI cables from their connectors on the back panel of the autoloader, and then remove the autoloader from its rack slot, if applicable, and place it on a table or other clear work surface.

⚠️ **WARNING:**   TO PREVENT INJURY, DISCONNECT THE POWER AND SCSI CABLES BEFORE REMOVING THE AUTOLOADER COVER AND KEEP FINGERS AWAY FROM THE FAN.

3. Use a screwdriver to remove the screws that secure the mounting brackets (if the autoloader is rackmounted) from both sides of the autoloader, remove the autoloader from the rack, and then place it on a cleared work space.

4. Remove the five screws on the back, and the screw on each side of the autoloader to loosen the autoloader cover.
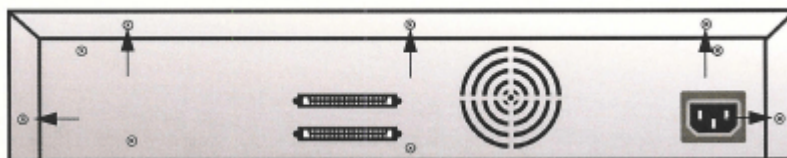
5. Remove the top cover by lifting it from the back and easing it out from under the front panel display cover, and then lift the cartridge carrier, with each cartridge you want to remove, straight up from the autoloader.

> ![NOTE icon] **NOTE:** To remove the carrier directly in front of the mail slot, gently rotate the carousel counterclockwise by moving the belt or carriers until the carrier is no longer in front of the mail slot.

6. On each carrier, carefully pull the cartridge lock lever away from the carrier, allowing the cartridge to slide out of the carrier.
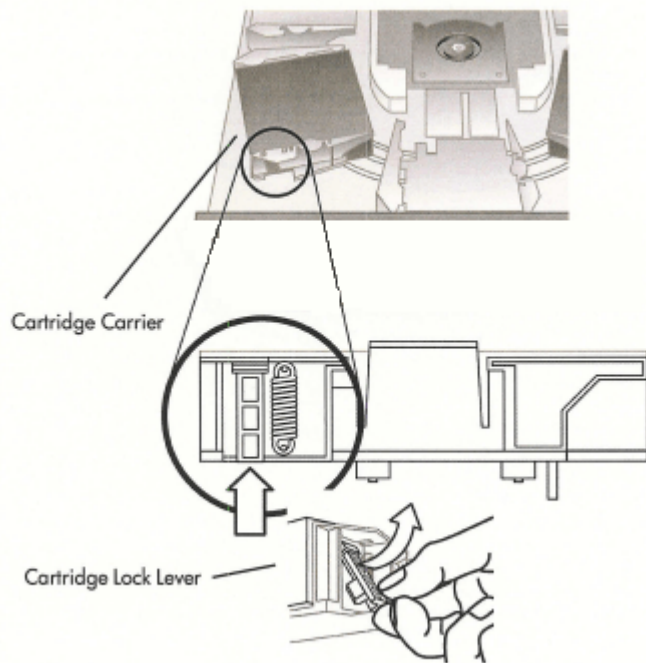
7. After removing the cartridges from the desired carriers, reinstall each carrier on the autoloader belt.

- • Make sure that the rollers on the bottom of the carrier are aligned in the carrier tracks.

- • Make sure that the belt post beneath each carrier are inserted into the proper autoloader belt loop.

NOTE: There are unused loops on the belt. The proper belt loops have an extra bump on the outside of the loop.
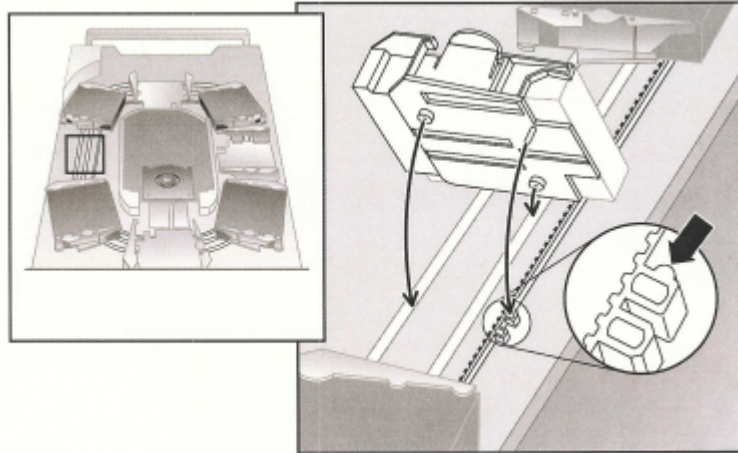
8. Ensure the carrier is properly installed on the belt by gently pressing on the top of the carrier and sliding it back and forth. If it is properly attached to the belt, it should not move. If it does, reinstall the carrier.

9. Replace the top cover of the autoloader and reinstall the eleven cover screws and mounting brackets.

Viewing Autoloader Error Codes

If an error occurs during operation of the autoloader, the autoloader stops the current operation and displays an error code on the top line of the LCD screen. Unless otherwise noted in **Table 7-2**, attempt to resolve the error by cycling power on the autoloader and retrying the last operation. If the error persists, contact ATAC (see **Contacting ATAC**).

To view the most recent error logs and events, see **Viewing Event Logs**.

Table 7-2 provides a description of each of the error codes.

Table 7-2   Error Codes

Error Code	Description	Details
80H-8FH		**Codes within this range indicate robotic control errors.**
81H	Invalid command error	This error indicates that the robotics have received an invalid command issued by the library controller. A communication failure or non-matching autoloader code.

Error Code	Description	Details
82H	Device status not suitable to execute this command	If the robotics are busy, some commands cannot be executed at the same time. This error indicates a probable violation. This is not an error condition, but does result in busy being reported to the host system for the requested SCSI command.
83H	Inventory not valid	The cartridge inventory is not valid because of manual changes or previous fatal errors. Update the inventory using appropirate Set Slot Status commands.
84H	Source element not ready	The transport source element is empty.
85H	Destination element not ready	The destination element is full.
88H	Communications error during loop-back	Cycle power on the autoloader and attempt the operation again. If the error recurs, contact ATAC support (see **Contacting ATAC**).
89H	Timeout detected by the autoloader on BHC testing	Cycle power on the autoloader and attempt the operation again. If the error recurs, contact ATAC support (see **Contacting ATAC**).
8FH	No error after autoloader recovery	Cycle power on the autoloader and attempt the operation again. If the error recurs, contact ATAC support (see **Contacting ATAC**).
90H to 96H		**Codes within this range indicate function errors.**
90H	Mechanical Initialization failure	The robotics were not able to move to the safe mechanical initialization position. Manual intervention is necessary.
91H	Inventory scan failure	Fatal robotic error occurred during the inventory scan (building up inventory). Power cycle the autoloader and see if the error repeats.
92H	Preposition failed	Belt positioning error occurred during **Preposition** command.
93H	Cartridge mount error	A failure occurred during movement of a cartridge into a drive.
94H	Cartridge dismount error	A failure occurred during cartridge removal and transport back to the slot.
95H	Import error	An error occurred while trying to import a cartridge to a slot.
96H	Export error	An error occurred while trying to export a data cartridge from its slot. Can be caused by an empty slot that is expected to be full.

Error Code	Description	Details
A0H to A5H		**Codes within this range indicate low level axis errors.**
A0H	Belt axis error	An error occurred during cartridge carrier movement (position not found).
A1H	Slider axis error	Transport slider unable to reach estimated position.
A2H	Gripper position error	Gripper unable to reach position.
A3H	Cartridge pick error	Missing cartridge during pick operation of gripper.
A4H	Door function error	Slider door in front bezel not in the requested position during device operation.
A5H	Fan Error	Autoloader processor detected a fan error.
B0H to B7H		**Codes within this range indicate electronic hardware errors.**
B0H	ROM error	Cycle power on the autoloader and attempt the operation again. If the error recurs, contact ATAC (see **Contacting ATAC**).
B1H	RAM error.	Cycle power on the autoloader and attempt the operation again. If the error recurs, contact ATAC support (see **Contacting ATAC**).
B2H	NVRAM error	Cycle power on the autoloader and attempt the operation again. If the error recurs, contact ATAC support (see **Contacting ATAC**).
B3H	CTC error	Cycle power on the autoloader and attempt the operation again. If the error recurs, contact ATAC support (see **Contacting ATAC**).
B4H	UART error	Cycle power on the autoloader and attempt the operation again. If the error recurs, contact ATAC support (see **Contacting ATAC**).
B5H	Display error	Cycle power on the autoloader and attempt the operation again. If the error recurs, contact ATAC support (see **Contacting ATAC**).
B6H	Memory error	Cycle power on the autoloader and attempt the operation again. If the error recurs, contact ATAC support (see **Contacting ATAC**).
B7H	Timeout on autoloader command	Cycle power on the autoloader and attempt the operation again. If the error recurs, contact ATAC support (see **Contacting ATAC**).

Error Code	Description	Details
BAH to BFH		**Codes within this range indicate drive errors.**
BAH	Drive load timeout	Cycle power on the autoloader. Verify that the fan is operational. If the error recurs, contact ATAC support (see **Contacting ATAC**).
BBH	Drive unload timeout	Cycle power on the autoloader. Verify that the fan is operational. If the error recurs, contact ATAC support (see **Contacting ATAC**).
BCH	Over temperature problem	Cycle power on the autoloader. Verify that the fan is operational. If the error recurs, contact ATAC support (see **Contacting ATAC**).
BDH	No connection to drive	Cycle power on the autoloader and attempt the operation again. If the error recurs, contact ATAC support (see **Contacting ATAC**).
BEH	Generic drive response error	Cycle power on the autoloader and attempt the operation again. If the error recurs, contact ATAC support (see **Contacting ATAC**).
BFH	Drive broken, needs repair	Cycle power on the autoloader and attempt the operation again. If the error recurs, contact ATAC support (see **Contacting ATAC**).

Getting Help

Before calling ADIC Technical Assistance Center (ATAC), follow these steps - which will help you take full advantage of your call:

- Review all documentation carefully.

- Be prepared to explain whether the software or hardware has worked properly at anytime in the past. Have you changed anything recently?

- Pinpoint the exact location of your problem, if possible. Note the steps that led to the problem. Are you able to duplicate the same problem or is it a one-time occurrence?

- Note any error messages displayed on your PC screen or file server. Write down the exact error message.

- If at all possible, call while at your computer, with the FastStor 2 autoloader installed and turned on.

- If running on a network, have all relevant information available (for example, type, version #, network hardware, etc.).

- Be prepared to provide:

  - Your name and your company's name

  - Model number

- Serial number of the FastStor 2 autoloader (obtained from the rear panel of the unit)

- Serial number for the Firmware Revision of Autoloader and Drive, accessed using the autoloader's Information menu (see **Viewing Firmware Levels**)

- Software version numbers

- Device driver information

- Host system application name and version

- Hardware configuration, including firmware versions, date, and number

- Type of PC, DOS version, clock speed, RAM, network type, network version, and any special boards installed

- A brief description of the problem

- Where you purchased your ADIC FastStor 2 autoloader

Having this information available when you call for customer assistance will enable the ADIC Technical Assistance Center personnel to resolve your problem in the most efficient manner possible.

Contacting ATAC

If problems cannot be solved with the aid of this document or if training is desired, contact the ADIC Technical Assistance Center (ATAC).

In the USA:	800.827.3822
Outside the USA, toll free:	00.800.9999.3822
Internet:	**www.adic.com**

FastStor Website

For the latest information and accessories on the FastStor 2, visit the product website at **www.adic.com/FastStor**. The most recent versions of all documents are also available through **www.adic.com**.

8

Specifications

Use the following information to learn more about the physical requirements necessary to use and store the autoloader, the capacity capabilities necessary to operate the autoloader, the environmental requirements necessary to operate the autoloader, and the operational requirements and media requirements for proper use of the tape drive.

Physical

Table 8-1 provides the physical requirements necessary to use and store the FastStor 2.

Table 8-1   Physical Specifications

Characteristic	Product Alone	Packaged
Height	8.8 cm (3.5 in)	20.3 cm (8.0 in)
Width	42.2 cm (16.6 in)	60 cm (23.6 in)
Depth	61.7 cm (24.3 in)	74.2 cm (29.2 in)
Weight	9.5 kg (21.0 lb)	13.2 kg (29.0 lb)

Capacity

Table 8-2 provides the capacity specifications for the FastStor 2 with an LTO-1 drive.

Table 8-2   LTO-1 Autoloader Specifications

Characteristic	Specification
Drive type	1 HP LTO Ultrium1 drive
Maximum storage capacity	Native: 800 GB Compressed: 1.6 TB (assuming 2:1 compression)

Characteristic	Specification
Maximum data transfer rate	Native: 15 MB/s Compressed: 30 MB/s
Number of slots	8
MCBF	250,000 cycles
Interface	LVD/SE Ultra-2 SCSI

Table 8-3 provides the capacity specifications for the FastStor 2 with an Super DLTtape 1 drive.

Table 8-3   Super DLTtape 1 Autoloader Specifications

Characteristic	Specification
Drive type	1 Quantum Super DLTtape 1 drive
Maximum storage capacity	Native: 1280 GB Compressed: 2.56 TB (assuming 2:1 compression)
Maximum data transfer rate	Native: 16 MB/s Compressed: 32 MB/s
Number of slots	8
MCBF	250,000 cycles
Interface	LVD/SE Ultra-2 SCSI, 68-pin HD connector

Table 8-4 provides the capacity specifications for the FastStor 2 with an LTO-2 drive.

Table 8-4   LTO-2 Autoloader Specifications

Characteristic	Specification
Drive type	1 HP LTO Ultrium2 drive
Maximum storage capacity	Native: 1600 GB Compressed: 3.2 TB (assuming 2:1 compression)
Maximum data transfer rate	Native: 30 MB/s Compressed: 60 MB/s
Number of slots	8
MCBF	250,000 cycles
Interface	LVD Ultra-3 wide SCSI

Environment

Table 8-5 provides the environmental requirements necessary to operate the FastStor 2.

Table 8-5   Environmental Specifications

Characteristic	Specification
Temperature	
Operating	10º to 35º C (50º to 95º F)
Non-operating	–40º to 60º C (–40º to 140º F)
Recommended operating temperature	20º to 30º C (68º to 86º F)
Temperature shock immunity - maximum rate of change	10º C per hour (50º F)
Humidity	
Operating	20% to 80% RH non-condensing
Non-operating	10% to 90% RH non-condensing
Altitude	
Operating	0 to 3,048 m (0 to 10,000 ft)
Non-operating	0 to 13,716 m (0 to 45,000 ft)
Vibration (3-500 Hz)	
Maximum acceleration to operating	0.6 g

Tape Drive

Table 8-6 provides the requirements necessary to operate a FastStor 2 configured with an LTO-1 tape drive.

Table 8-6   LTO-1 Drive Specifications

Description	LTO-1
Read/write transfer rate: maximum sustained	Non-compressed mode:15 MB/second Compressed (2:1 typical): 30 MB/second
Burst transfer rate	80 MB/second
Average access time	71 seconds
Temperature shock immunity– maximum rate of change	20º to 30º C (68º to 86º F) – 10º C per hour (50º F)

Description	LTO-1
Loading time to BOT (for previously written tape)	< 25 seconds
Unloading time from BOT	< 13 seconds
MTBF	250,000 hours
Interface type	LVD/SE Ultra-2 wide SCSI-2

Table 8-7 provides the requirements necessary to operate a FastStor 2 configured with an Super DLTtape 1 tape drive.

Table 8-7   Super DLTtape 1 Drive Specifications

Description	Super DLTtape 1
Read/write transfer rate: maximum sustained	Non-compressed mode:16 MB/second Compressed (2:1 typical): 32 MB/second
Burst transfer rate	80 MB/sec.
Average access time	70 seconds
Temperature shock immunity**–**maximum rate of change	10º to 40º C (50º to 104º F) **–** 11º C per hour (51.8º F)
Loading time to BOT (for previously written tape)	12 seconds
Unloading time from BOT	12 seconds
MTBF	250,000 hours
Interface type	LVD/SE Ultra-2 SCSI

Table 8-8 provides the requirements necessary to operate a FastStor 2 configured with an LTO-2 tape drive.

Table 8-8   LTO-2 Drive Specifications

Description	LTO-2
Read/write transfer rate: maximum sustained	Non-compressed mode:30 MB/second Compressed (2:1 typical): 60 MB/second
Burst transfer rate	160 MB/second
Average access time	52 seconds
Temperature shock immunity**–**maximum rate of change	10º to 40º C (50º to 104º F) **–** 10º C per hour (50º F)

Description	LTO-2
Loading time to BOT (for previously written tape)	< 19 seconds
Unloading time from BOT	< 19 seconds
MTBF	250,000 hours
Interface type	LVD Ultra-3 wide SCSI

Media

⚠️ **CAUTION:** **Do not degauss LTO cartridges! Ultrium LTO cartridges are pre-recorded with a magnetic servo signal at the factory. This signal is required in order to use the cartridge with the Ultrium LTO drive. Keep magnetically charged objects out of close range.**

Regarding media, observe these general rules:

- Use only drive-appropriate formatted cartridges. Formatted cartridges contain embedded servo code, written on the media, during the cartridge manufacturing process. Cartridges cannot be bulk erased or degaussed.

- Clean the tape drive when the Clean Drive LED is illuminated. Be sure to use only drive-appropriate cleaning cartridges.

Table 8-9 provides the media requirements necessary to use an LTO-1 tape drive.

Table 8-9   LTO-1 Media Specifications

Characteristic	LTO-1 Media
LTO -1 format capacity	100 GB (non-compressed) 200 GB (2:1 typical compression)
Basic description	Advanced metal particle
Tape length	609 meters (1,998 feet)
Cartridge dimensions	10.2 x 10.54 x 2.15 cm (4 x 4.15 x.85 in)
Shelf life	30 years minimum @ 20° C, 40% RH (non-condensing)
Cartridge life	1,000,000 passes (approximately 2000 full backup or restore operations)
Cleaning	15 uses

Table 8-10 provides the media requirements necessary to use the Super DLTtape 1 tape drive.

Table 8-10   Super DLTtape 1 Media Specifications

Characteristic	Super DLTtape 1 Media
Super DLTtape 1 format capacity	160 GB (non-compressed) 320 GB (2:1 typical compression)
Basic description	Advanced metal powder
Tape length	558 meters (1,833.5 feet)
Cartridge dimensions	10.56 x 10.53 x 2.54 cm (4.1 x 4.1 x 1.0 in)
Shelf life	30 years minimum @ 20° C, 40% RH (non-condensing)
Cartridge life	1,000,000 passes (approximately 2000 full backup or restore operations)
Cleaning	20 uses

Table 8-11 provides the media requirements necessary to use the LTO -2 tape drive.

Table 8-11   LTO-2 Media Specifications

Characteristic	LTO-2 Media
LTO-2 format capacity	200 GB (non-compressed) 400 GB (2:1 typical compression)
Basic description	Advanced metal particle
Tape length	609 m (Total), 580 m (for Data)
Cartridge dimensions	10.20 x 10.54 x 2.15 cm (4.0 x 4.1 x .85 in)
Shelf life	30 years minimum @ 20° C, 40% RH (non-condensing)
Cartridge life	1,000,000 passes (approximately 2000 full backup or restore operations)
Cleaning	15 uses

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